

## Use Case 6: Network Colouring

### Summary:

Based on a topology analysis, the network coloring presentation provides a clear and simple view of:

- electrical status of equipment (energized, de-energized, grounded, abnormal),
- presence of loops and parallel infeeds,
- equipment galvanically connected downstream or upstream to a point defined by the operator,
- galvanic path between two points defined by the operator,
- limit violations (e.g. loads, voltages).

This procedure describes what activities are performed by an operator in the control room when he want's to get topological information combined with electrical status information. The operator realizes the network connectivity and electrical status of power system.

### Actor(s):

Name	Role description
Operator in the control room	performs a network state analysis.

### Participating Systems:

System	Services or information provided
Network Operation	<ul style="list-style-type: none"> <li>• Network operation monitoring (network state supervision)</li> </ul>
Operational Planning and Optimization	<ul style="list-style-type: none"> <li>• Network operation simulation (Power flows computation)</li> </ul>

### Pre-conditions:

The SCADA System is in operation. The operator is logged in the system. The operator wants to have an overview of the network status.

### Assumptions / Design Considerations:

The operator gets the updated picture within a defined span of time.

### Normal Sequence:

Use Case Step	Description
Select Coloring Mode by energize/de-energize	The operator investigates if every thing is being fed and if not he can find out the cause [UC23], [UC30] and [UC31].
Select Coloring Mode by voltage levels	The operator investigates if anything is different, not normal with the voltage levels (what should very rare, almost impossible)
Select Coloring Mode by load distribution	The operator investigates from which source a feeder is being fed and where are the open points between to sources. (This information about the open points will be used in Network Reconfiguration or Line Down.)

Select Coloring Mode by target element to source	The operator investigates which source is feeding a particular element. The operator could select the coloring mode that would allow him to go from the element to the source, clearing away his doubt.
Select Coloring Mode by overloaded lines	Display all lines that are overloaded according to the last Power flows computation.

**Exceptions / Alternate Sequences:**

The sequence of operation steps is exchangeable.

**Post-conditions:**

The updated, colored picture is presented by the system.

**References:**

- [1] Use Case - Temporary network changes UC23(temp\_net\_changes.doc)
- [2] Use Case - Short circuit localization UC30(short\_circuit\_loc.doc)
- [3] Use Case - Earth fault localization UC31(earth\_fault\_loc.doc)